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# Journal of the Society of Arts.

FRIDAY, APRIL 10, 1868.

## Announcements by the Council.

### ORDINARY MEETINGS.

Wednesday evenings, at Eight o'Clock :—

APRIL 15.—“On Liquid Fuel.” By BENJAMIN H. PAUL, Esq.

APRIL 22.—“On the Cultivation of Beetroot, and its Manufacture into Sugar.” By W. A. GIBBS, Esq.

APRIL 29.—“On Progress in Oyster Culture.” By HARRY LOBB, Esq.

### ALBERT MEDAL.

The Council will proceed to consider the award of the Albert Medal at their first meeting in May next. This medal was instituted to reward “distinguished merit in Promoting Arts, Manufactures, or Commerce,” and has been awarded as follows :—

In 1864, to Sir Rowland Hill, K.C.B., “for his great services to Arts, Manufactures, and Commerce, in the creation of the penny postage, and for his other reforms in the postal system of this country, the benefits of which have, however, not been confined to this country, but have extended over the civilised world.”

In 1865, to His Imperial Majesty the Emperor of the French, “for distinguished merit in promoting, in many ways, by his personal exertions, the international progress of Arts, Manufactures, and Commerce, the proofs of which are afforded by his judicious patronage of Art, his enlightened commercial policy, and especially by the abolition of passports in favour of British subjects.”

In 1866, to Professor Faraday, D.C.L., F.R.S., for “discoveries in electricity, magnetism, and chemistry, which, in their relation to the industries of the world, have so largely promoted Arts, Manufactures, and Commerce.”

In 1867, to Mr. W. Fothergill Cooke and Professor Charles Wheatstone, F.R.S., in recognition of their joint labours in establishing the first Electric Telegraph.

The Council invite Members of the Society to forward to the Secretary, before the 15th April, the names of such men of high distinction as they may think worthy of this honour.

### SUBSCRIPTIONS.

The Lady-day subscriptions are due, and should be forwarded by cheque or Post-office order, crossed “Coutts and Co.,” and made payable to Mr. Samuel Thomas Davenport, Financial Officer.

## Proceedings of the Society.

### FOOD COMMITTEE.

The Committee met on Wednesday, March 18th. Present—B. Shaw, Esq. (in the chair); Mr. Harry Chester, Captain Grant, Mr. G. F. Wilson, F.R.S., Mr. Edward Wilson, Mr. J. Ludford White, Rev. J. E. Hall, and Mr. E. Holland.

At the conclusion of Mr. Barry's evidence, published last week,

Mr. FRANK BUCKLAND attended to give information on the subject of fish and means of increasing the supply.

Mr. BUCKLAND—I am very glad that the Society of Arts has instituted this inquiry, because it gives a stimulus to public opinion in the right direction. I have taken as much pains as possible to obtain information for the Committee, and, with your permission, I will make my statement in my own way. I shall be glad to give you evidence upon river fisheries, pond and lake fisheries, sea fisheries, and upon crustacea. I have made a list of fish that may be eaten, classifying them into migratory fish—river fish—pond and lake fish—and what are commonly called “shellfish.” As regards migratory fish, I have on my list salmon, sewen, sea trout, bull trout, whitebait, eels, shad, sturgeon, smelt, lampreys, lamprey, and others; fifteen varieties. River fish—Jack, barbel, bream, burbot, chub, grayling, perch, river trout, gudgeon, roach, dace; eleven varieties. Pond and lake fish—Lake trout, pown, char, carp, tench, bream; six varieties. Sea fish—Turbot, cod, haddock, soles, whiting, pollock, coalfish, halibut, brill, dabs, mullet, mackerel, plaice, wrass, skate, bream, herrings, pilchards, gurnet, gurnard, dorey, ray, weaver, sprats, dogfish, anchovy, garfish, conger, sand lance, catfish, ling, flounder, hake, and bass; thirty-three, making 65 kind of economic fish. Then we have among the crustacea—crabs, lobsters, prawns, shrimps, mussels, whelks, cockles, oysters, scallops, and crayfish. These are only the families, but there are many sub-families; for instance, among the dogfish there are half-a-dozen kinds, so that you have enormous scope for your operations in dealing with 65 kinds of economic fish besides the crustacea. I begin with the salmon, which has been already cultivated to some extent, and may well be deemed the most important. In order to show you, and through you the public, what has been done for the preservation of the salmon fisheries, which had been much neglected until the subject was taken up by Parliament in 1861, I will show you how England has been divided into salmon districts, or what may properly be termed “fish parishes.” There are 34 districts and 34 boards of conservators, who have machinery at their command to protect the interests of the salmon; and be it observed that these gentlemen have no pecuniary interest whatever in the matter, but act entirely *pro bono publico*. The districts are as follows:—The Coquet, the Tyne (which is now being highly cultivated by the Duke of Northumberland), the Tees, and the Trent; then crossing to the north western coast there is the Kent, the Lume, and the Ribble, which last is a most valuable river. Then we come to another exceedingly valuable district, the Dee, out of which nearly £15,000 worth of salmon was taken last year. Then come the Clwyd and Elwy, the Conway, the Seiont (a new and promising district), the Dovey, the Teify (which is worth £3,000 a year, and might easily be made worth £9,000); then there come the Cleddy, the Towey Lougher, &c. (beautiful little rivers), the Severn, the Wye, the Usk, all emptying themselves into the estuary of the Severn, and forming a most valuable property. Then we come to a new district, the Avon, not yet cultivated, but just beginning to be so. Then we come to the Taw and Torridge, the Camel, Tamar, Fowey, then another Avon; then the Dart, the Exe (which is just beginning to be cultivated),

the Axe, the Frome, and then the Stour. Then there are no more districts until we come to the Canterbury Stour, the latest formed district and one of the most promising. You see, therefore, that these districts extend nearly all round England. We want to make two new districts if we can, that of Itchin and Test, and the Avon and Rother. A district is created by the country gentlemen in the neighbourhood, acting under the provisions of the Act, and the Secretary of State signs the authority and gives effect to the matter. There are now 1987 miles of salmon river more or less under protection, and the number of square miles which these rivers drain is 16,661. Under this system of cultivation I am glad to say that the produce of England is increasing as regards the quantity of salmon brought to market. My friend, Mr. Ashworth, some time since gave me a comparative statement as to the produce of England, Ireland, and Scotland. He says, that Scotland was supposed to contribute nearly £500,000, Ireland, £300,000, and England about £10,000 a year; that was in 1863. The Salmon Acts have since been passed, and England and Wales are now beginning to perceive the beneficial result.

The CHAIRMAN—What does the protection amount to?

Mr. BUCKLAND—To a surveillance of the salmon when spawning, and to the prevention of poaching, &c. Licenses are issued, so that if I have a right to fish in a certain river, I have to pay a certain sum, which goes to a general fund, which is used for the protection of the fish at spawning time, and this is the most important point. The Government has assented to the principle that those who make a profit by the salmon should pay something towards the production of the parent salmon, and this really is the object of having a district. The amount of salmon which is brought to the London market is much greater than it used to be. I have had great difficulty in obtaining information on this point, because people are very reluctant to show their books; but there is one very public-spirited salesman at Billingsgate, Mr. Ridpath, of the firm of Forbes, Stewart, and Co., who has kindly analysed his books for me, and the result is as follows:—In 1864 the number of boxes of salmon received from English and Welsh rivers was 752; in 1865, 868; in 1866 the number jumped up to 1,563; and in 1867 they were 2,406. I consider that to be very satisfactory; and if the law is thoroughly carried out, I see no reason why, some day, the 2 should not be turned into a 4. There are, however, certain things which I desire to call your attention to; and if you really wish to benefit the public, there are three points to which you should direct your efforts. The first point is pollution. I have been rendered quite miserable by looking at the upper waters of some of our most valuable rivers, such as the Tyne, the Wear, and the Tees. At the head waters of these rivers there are large lead mines, and the existence of something in the washings of lead in the rivers is incompatible with the life of salmon. I am nearly certain of what is the actual cause of death, but it is not necessary to state it now. The South Tyne is nearly destroyed as a salmon river by the lead mines, but in the north Tyne, which is free from these lead mines, there is an enormous quantity of salmon. What is required is, to get the mine-owners simply to make catch-pits, in which the water may rest a certain time before it is discharged into the river. That is all I ask, and it would not occasion much expense. That has been done in two or three cases, not to a sufficient extent, but enough to show that the principle is a good one, and would be successful if carried out. In July last I saw numbers of salmon and seven dead from lead water. The poor things went up the river, and, as soon as the "hush" came down they were killed. That river might be made to produce a great deal of money if you could only persuade the mine owners at the top to keep their dirty water out of the river. There are other pollutions also to which I desire to call attention. For instance, chloride of lime from paper mills will kill the fish, and I say it is

cruel to the fish, as well as destructive to human food, to turn into a river chloride of lime, as this might be got rid of in other ways. Of course, as an individual I am the friend of the salmon, but as a public officer, I am quite ready to admit that manufacturers have rights which ought to be considered, but I contend that we may consider both manufacturers and fish. The second point is that of weirs. A salmon is a sea fish proper, which goes to the top of a river to deposit its eggs, and the more salmon that go up the better for the proprietor. The salmon wish to go up, but in many cases they cannot do so, because a wall has been built across the river for the purpose of driving a mill wheel. The water is transferred into the mill leat, and turns the mill, which may be a corn mill, a cotton mill, a paper mill, &c. The fish cannot possibly pass these weirs, except in the time of floods, and thus large districts of spawning ground are blocked up by them. My friend, Mr. Ashworth, has written a pamphlet, in which he ably proves that an immense deal of injury is done by these weirs, *quoad* salmon, and, so far, I quite agree with him. Nevertheless, Mr. Ashworth says that by these weirs salmon are excluded from an area of 7,991 square miles, and he particularly instances the tributaries of the Wye and the Severn, and I know that this is the fact from my own observation on the Ribble. I think this is a question of bread *v.* fish, most of the weirs being applied to corn mills, but I cannot see why we should not have both bread and salmon. If the millers will only be kind enough to allow the fish the use of the water at night and on Sundays, when the mill is not at work, then all ends would be answered. My friend here, Mr. Garnet, has an important weir on the Ribble, and he has made a pass on it for the fish to go up the river.

Mr. GARNET—I think I ought to say that I have had this fish-pass for the last thirty years. The width is 17ft., and there is a rise of 3ft. in a run of 63, or one in twenty-one.

Mr. BUCKLAND—The third point is canals. I am a great advocate for fresh water, and I don't think rivers should be entirely robbed of their water in order to supply canals. I hear there is a project to make a canal at the head of the river Dee, which will take away a great quantity of the water; and there is another project to take water from the head of the Severn.

Mr. CHESTER—That would require an Act of Parliament?

Mr. BUCKLAND—Yes; but I am afraid it will be passed. It is a very simple matter; the fish cannot swim without water.

Mr. CHESTER—Are water-mills increasing in number or are they giving place to steam?

Mr. BUCKLAND—Mr. Ashworth wishes to show that steam power would be more profitable than water power on a salmon river. For instance—if a man makes £100 a year out of his mill, it would be better to knock down the weir and substitute steam, and get £150 out of the river in salmon.

Mr. CHESTER—That would depend on the part of the river he was in; the fish might all be stopped below?

Mr. BUCKLAND—Yes, that is true; but if all would agree to it, it would be better. If water-power were replaced by steam on the Dee, it would be of immense importance. At Chester there is a weir which entirely prevents the fish from ascending the river. The upper proprietors say it is no use their protecting the fish, when they are not allowed to reach them on their return from the sea, and thus many fish are prevented from ascending, whereas if a pass were made in the weir, so that the fish might pass, and the upper proprietors were allowed to catch a certain proportion with their rods, which was all they wanted, they would willingly co-operate in cultivating and protecting the fish.

Captain GRANT—What about the greaves and putchers?

Mr. BUCKLAND—There is a tax on every one of these. First of all they must prove their legality to the satis-

faction of the board, for if they cannot do so they are at once abolished. If, however, they are proved to have a charter from William the Conqueror, or anything of that sort, then a tolerably heavy licence is put upon them, which is fixed by the Act. This money does not go into the pockets of any private person, but into the hands of the Board of Conservators, who pay out of it the water bailiffs who protect the salmon; and each salmon thus protected in spawning time brings back a large amount of money. I calculate that, upon the very lowest estimate, each salmon nest is worth £5. When I hear of one river yielding 20,000 salmon, and people calling it good, I laugh at it as a naturalist, because I can get that number, as I did last winter, out of two salmon. If we breed salmon artificially we can get a basketful of eggs from each fish, and what is 20,000? Nothing at all. Only attend to these three points I have named, breed the fish in the river, and they will all come back again to a certainty.

MR. CHESTER—Your three points are—not to let the rivers be robbed of their necessary water; not to allow them to be polluted; and, thirdly, not to allow of obstacles which prevent the salmon going up to the breeding grounds. We cannot do away with the mills altogether, but you suggest that the weirs should be open at night and on Sundays. Have you any further suggestion to make in that direction, such as the erection of fish ladders?

MR. BUCKLAND—What we really want is compulsory power to make the millowners let the fish pass, in some way or other, to the satisfaction of the board.

Captain GRANT—At all times, and do away with the Queen's gap?

MR. BUCKLAND—That must depend upon circumstances.

MR. CHESTER—Have you any suggestions to make as to equalising the rights of proprietors at different parts of the river, so that all the fish should not be taken in the lower part of the river?

MR. BUCKLAND—If the weirs were opened a certain quantity would go up.

Captain GRANT—Look at the Wye, where I rented two miles. Last season I do not suppose there were thirty fish taken with the fly above Hereford, while the millers took 500 at one haul. Unless the river is made as free for the fish to ascend as the high road is for cattle, the upper proprietors who subscribe for the preservation of the fish might as well throw their money into the river. The lower proprietors get all the fish, and even if all the putchers and greaves, or whatever else they are called, were removed, they would still retain a great advantage over the upper ones upon the principle of first come first served. The system of stake nets and fixed nets is prohibited; but the way the millers manage is to have three nets, one behind the other, so that hardly a fish can escape. I say the fishing is not equally distributed. The upper proprietors preserve the fish, and the lower ones get all the benefit. I, for one, have withdrawn my subscription in consequence.

MR. BUCKLAND—They cannot use the nets in flood time.

Captain GRANT—And that is the only chance which the upper proprietors have. I say do away with that monstrous absurdity, the Queen's gap.

The CHAIRMAN—What is the Queen's gap?

Captain GRANT—It is a small gap of so many hours a week for the fish to pass up. In some places they have no other chance of going up, and thus the lower proprietors have the benefit of the fish the whole of the week with the exception of this Queen's gap of 42 hours.

MR. GARNETT—I have no business to speak, but if Mr. Buckland will pardon me interrupting him, having had an experience of fishing for more than 40 years, I can say a word or two as to the increase of the fish. I have been some years a member of the Board of Conservators of the Ribble, and that board took a lease of the fisheries

from the proprietors. In 1859, we took a number of sea trout and 90 salmon. In 1866, the water bailiff tells me they took in one week 3,133. That is a satisfactory proof of the increase, although I should say that both years were extraordinary; 1859 for drought, and 1866 for a succession of floods, which caused a large increase in the quantity of fish caught in all the rivers of England. The Hodder, a tributary of the Ribble, swarms with sea trout; and there is not a weir in the whole length, and yet the fish, from some peculiarity, never ascend to the upper reaches until the month of September, of which Col. Towneley complains very bitterly. He says:—"Here have I turned down 800,000 young salmon and I never see them back again." After September, however, they ascend the river freely and spawn very extensively there. The nominal weekly close time is 42 hours, but it is not so in reality. There are about forty days from the first of May, when the fish begin generally to ascend the Ribble, to the 31st of August, when the fishing ceases, reckoning 42 hours per week; but on the average of seasons, owing to droughts or freshes during two-thirds of that time, the water is not in a condition for the fish to go up. Consequently, there are only about 12 or 14 days in which to supply the upper proprietors for a length of 100 miles; the lower proprietors taking all the remainder. I remember incidentally suggesting to Sir George Cornwall Lewis at the time the Bill of 1861 was before the House, that either there should be no fishing allowed at night, or that three days a week should be set apart for the fish to ascend the river. Sir George Cornwall Lewis said—"You might just as well propose to shoot partridges only three days a week." I said—"The cases are not at all analogous; if the partridges had all to migrate before they could be killed, if they all returned like salmon by the same track, and if 90 per cent. were taken on the road by those who neither fed them nor bred them, I think a change in the law would soon be called for." That is just the case with salmon. They migrate chiefly at night, and at that time no fishing should be allowed.

MR. BUCKLAND—I now pass on to the other river fish. I advise you to pay attention to them, and to cultivate if you can coarse river fish throughout England. Rivers that will not carry salmon may carry coarse fish, and they only need to be protected in the months of May and June. There is no doubt of people eating these fish, roach, dace, and everything else. You see there is a demand for jack and other fish which are brought over from Holland. The common river trout ought to be cultivated by artificial means. With regard to pond and lake fish, I do entreat you to pay attention to the char of the Cumberland and Westmoreland lakes. It is now used for "potted char" in the height of the spawning season, and we all know that if you kill a fish when about to reproduce, there will be no progeny. The pownen and pollen of the Irish lakes are exceedingly valuable; and so are tench and carp. These latter may be cultivated by placing hurdles in the water in the last week of May or the first week of June, on which the carp will deposit their eggs, and they will then multiply exceedingly. The carp ponds should be thoroughly netted every year, and the fish should be sorted and sent to market as they arrive at a proper condition. You may receive it as a maxim that if you have too many fish in a pond they will decrease in size. I now come to the question of new kinds of fish. I know of only three. This [producing a dried specimen] is the *Perca Lucio*, a ravenous fish, something between a jack and a perch. It is very good eating, but a very voracious fish. They live in ponds, and, as Mr. Wilson knows, are very abundant in the markets of Berlin.

MR. WILSON—It is some years since I tasted one, but I think it eats more like perch than jack. They are very good eating.

MR. BUCKLAND—They will do very well in places where you have command of them, but for goodness sake do not

let them get into the rivers. The next is the *Silurus glanis*; the nearest fish of ours to it is the burbolt. It will do in ponds; it lives in the mud, and eats the fry of roach and dace. I took some down to Aldermaston, but they disappeared, and I do not know what became of them. Lastly I may call attention to a fish described in a book by Mr. H. W. Herbert, entitled "Fish and Fishing in the United States," called the Otsego bass, but it is in reality a char. The white fish of Canada is nearly allied to the gwinniad of North Wales. The Otsego bass is not a bass at all. The Acclimatization Society has tried to get some over, but as yet has failed. My friend, Mr. H. Lee, has offered a reward of £20 for the introduction of the "gourami," from the Mauritius. I am anxious to impress upon you, however, the importance of cultivating the fish that we have got to the fullest extent, rather than divert attention to the introduction of new species. I would follow this up by pointing out the desirability of cultivating the Norfolk broads, where there are a great number of acres of water, which, if judiciously managed, might be made to produce a large amount of food for the people. Before passing to the subject of sea-fish, I may mention that the amount of money paid for licenses for nets, rods, &c., which money all goes to the preservation of fish, is £4,807. The license for a draught net is £5, and there are 486 of these in England. There are 1,807 rods. The total number of men employed, according to the returns we have, is 3,970; but many districts do not send an accurate return, and the total number is probably between 4,000 and 5,000. The total amount of fines inflicted has been £641. It ought to have been three times as much. These figures will show the importance of our salmon fisheries. During the last five years a good deal has been done in the distribution of salmon by artificial means. I have sent to different places a great number of salmon and trout in the egg state. We have a hatching apparatus at the Horticultural Gardens, and I have distributed a good many on the part of the Acclimatization Society, and on my own part, during the last three years. Fish culture has been taken up by her Majesty, who has stocked the Obelisk Pond in Windsor Park with Great Lake trout; and this is the third year of the experiment. The Duke of Marlborough has done the same at Blenheim, and Lord Bath has done the same at Longleat-park. Mr. Burr, also, and many other persons, have applied to me for eggs; but we want a central Piscicultural Society, the same as there is at Huningue, to distribute the fish.

#### CANTOR LECTURES.

The fourth lecture of Dr. Crace Calvert's course, "On Chloride of Sodium, or Common Salt, the Products obtained from it, and their Applications to Arts and Manufactures," was delivered on Tuesday evening, the 7th of April. These lectures will be published in the *Journal* during the Vacation.

#### Proceedings of Institutions.

##### EXAMINATIONS, 1868.—LIST OF LOCAL BOARDS.

ABERDEEN.—Mr. James Matthews, *Chairman*; Rev. John Longmuir, LL.D.; J. Cruickshank, LL.D., late Prof. of Mathematics; J. S. Brazier, Prof. of Chemistry; R. Beveridge, M.D.; Messrs. W. Rattray, D. Mavor, and John Menzies. The above constitute the *working* Local Board. The following are also *ex-officio* members:—The Lord Provost of Aberdeen, Wm. Brebner, John Keith, Patrick Watson, Wm. Fraser, Rev. John Thomson,

John Manson, James W. Barclay, John R. M'Kenzie, George Falconer, Alexander Yule; Messrs. J. Miller, T. Melville, J. Berry, A. D. Milne, J. Grey, and R. Leys; Mr. J. Sinclair, *Mechanics' Institution*, Aberdeen, *Secretary*.

ALDERSHOT AND FARNHAM.—Captain E. E. Mangles, *Chairman*; Dr. Barker, Messrs. W. H. Bayley, J. Belling, B.A.,—Bevan, Rev. R. Campbell, R. O. Clarke, Geo. Dewdney, B.A.; Sir C. W. Dilke, Bart., M.P.; Messrs. F. Eggar, Rev. Geo. Fox, Rev. H. R. Julius, M.A.,—Mason, Rev. D. Malden, Thomas W. Mayer, R.E.; Rev. S. C. Morgan, M.A.; Capt. G. Newcome, J.P.; Lieut.-Col. Newdigate, the Staff, Messrs. B. Nichols, —Ollis, H. Poppleton, L.C.P., E. Powell, S. Redgrave, George Sclater-Booth, Esq., M.P.; Dr. J. Shoolbraid, M.D.; Messrs. Sloman, C. Stroud, the Ven. Archdeacon Utterton, Rev. J. Webster, Messrs. T. White, T. Wonnacott, W. Hollest, *Treasurer*, and Barrow Rule, *Classical and Mathematical School*, Aldershot, *Secretary*.

ALTON.—Mr. William Curtis, *Chairman*; Messrs. W. Curtis, jun., Samuel Bickerton, Edwin Williams, and John Bryant, Post-office, Alton, *Secretary*.

ASHFORD.—Revs. J. P. Alcock and W. Anderson; Messrs. J. J. Cudworth, R. C. Mansell, T. H. Vie, J. Keener, R. Rabson, F. Garaway, and Thomas Nesbit, 11, Dover-place, Ashford, *Secretary*.

BANBRIDGE (IRELAND).—Mr. W. Waugh, J.P., *Chairman*; Mr. R. McClelland, *Vice-Chairman*; Messrs. J. W. McMaster, J.P., J. Hawthorn, M.D., J. Smyth, jun., C.E., G. G. Tyrrell, W. Walker, H. Finlay, J. Noble, H. Glass, T. Connor, R. Davidson, and Hugh McMullan, jun., Dromore-street, *Secretary*.

BANBURY.—Rev. H. Back, *Chairman*; Messrs. T. W. Barrows, T. Beesley, F.C.S., R. H. Brooks, W. Johnson, F.R.A.S., D. Pidgeon, A. B. Rye, F.R.C.S., J. Stockton, Rev. G. St. Clair, F.G.S., A. Wilson, M.A., Mr. J. H. Beale, *Mechanics' Institute*, Banbury, *Secretary*.

BELFAST (ACADEMY) SCIENCE SCHOOL.—John Lytle Esq., J.P., *Chairman*; David Taylor, Esq. (Ex-mayor of Belfast); Wm. Mullan, Esq., J.P. (Ex-mayor); Dr. Andrews, Vice-President, Queen's College, Belfast; Dr. Hodges, Professor, Queen's College, Belfast; Rev. J. Macnaughtan, M.A.; T. M. Birnie, Esq., J.P.; R. Nesbitt, Esq., Inspector of Schools; R. C. Brown, Esq., A.M.; C. Aitchinson, Esq.; S. D. S. Cunningham, Esq.; Robert Patterson, Esq., F.R.S.; Thomas Lowry, Esq.; James Alexander, Esq., J.P.; James Patten, Esq., LL.D., late Head Inspector of Schools; Rev. Thomas Toye, Archibald Kent, Esq.; Wm. Warwick, Esq., M.D., M.R.C.S.E.; Wm. Gibson, Esq.; John Molloy, Esq., Inspector of Schools; H. Hanna, Esq., M.D., M.R.C.S.E.; Henry Murphy, Esq.; G. Gerald Bingham, Esq.; D. Pasley, Esq. The following are additional members:—Rev. R. J. Bryce, LL.D.; Rev. James McCosh, LL.D., Professor, Queen's College, Belfast; Rev. Dr. Knox; Robert Young, Esq., C.E.; Alex. MacLaine, Esq.; T. G. Houston, Esq., M.A.; James McNeill, *Secretary*.

BELFAST LITERARY INSTITUTE.—Mr. Joseph J. Murphy, *Chairman*; Revs. Isaac Nelson, John Scott Porter; Messrs. Robert Patterson, Thomas McClinton, Charles Rennie, John Ireland, Thomas J. McConkey, Wm. T. Matier, Robert Jamieson, Thomas Morrison, Francis A. Maitland; Rev. W. C. McCullagh, *Secretary*.

BIRMINGHAM AND MIDLAND.—William Mathews, Junr., M.A., *Chairman*; Messrs. William Kenrick, and Thomas Avery, the Rev. Charles Evans, M.A., and the Rev. T. E. Espin, B.D.; Sir Robert Peel, Bart., M.P.; Mr. Alderman Ryland, Mr. Alderman Sturge, and Mr. Alderman Wiggan, Councillor Yates, Messrs. W. C. Aitken, J. T. Bunce, Stephen Barker, J. H. Chamberlain, Sebastian Evans, M.A., J. B. Gausby, Trehawke Kewich, Thomas Martineau, C. T. Parsons, Henry Payton, Samuel Timmins; and Edwin Smith, Birmingham and Midland Institute, Birmingham, *Secretary*.

BISHOPS STORTFORD.—Rev. T. T. L. Bayliff, M.A., *Chairman*; Rev. W. J. Copeland, B.D.; Revs. G. Good-

man, J. Menet, M.A.; Messrs. G. A. Starling, M.D., L.R.C.P., and F. W. Nash, B.A., Birchanger, Bishops' Stortford, *Secretary*.

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YORK.—Rev. H. V. Palmer, *Chairman*; Messrs. W. Gummerson, C. Sellers, H. Wilson, W. Bartle, J. Holtby, E. W. Wilson, E. T. Wilkinson, T. J. Wilkinson, W. Coates, Charlton, Revds. G. V. Smith and E. Robinson, and Robert Hall, 8, Feasegate, York, *Secretary*.

## TECHNICAL EDUCATION.—MR. WHITWORTH'S BENEFACTION.

The following minute in reference to this munificent gift has been passed by the Lords of the Committee of Council on Education:—

### SCIENCE AND ART DEPARTMENT, SOUTH KENSINGTON.

At Whitehall, the 27th day of March, 1868, by the Right Hon. the Lords of the Committee of Her Majesty's Most Honourable Privy Council on Education.

My Lords consider Mr. Whitworth's letter to the First Lord of the Treasury, dated the 18th of March, 1868. In this letter Mr. Whitworth offers to found 30 scholarships of the annual value of £100 each, to be applied for the further instruction of young men, natives of the United Kingdom, selected by open competition for their intelligence and proficiency in the theory and practice of mechanics and its cognate sciences, with a view to the promotion of engineering and mechanical industry in this country; and he expresses hopes that means may be found for bringing science and industry into closer relation with each other than at present obtains here:

It is unnecessary now to repeat the thanks which the First Lord of Her Majesty's Treasury and the Lord President of the Council have already conveyed to Mr. Whitworth for his generous offer, which they are convinced the country will fully appreciate.

Mr. Whitworth proposes that these Scholarships should be tenable on conditions to be defined by a deed of trust regulating the administration of the endowment fund during his life, and that thereafter the management of this fund, subject to the conditions specified therein, should rest in the Lord President of the Council or other Minister of Public Instruction for the time being.

It is the wish of my Lords to see provision made in several large centres of manufacturing industry in the United Kingdom for affording to all classes of Her Majesty's subjects ample opportunities for acquiring instruction in the sciences which are applicable to productive industry. My Lords are of opinion that by the union of local and private efforts, supplemented as far as is proper by State assistance, this provision will be best made.

This will be rendered easy if the munificent example set by Mr. Whitworth shall be extensively followed by others.

My Lords will be happy to receive any further suggestions from Mr. Whitworth should he desire to make them, and to be informed if the department can render him any assistance in carrying out his liberal intentions.

The following is a report of the debate in the House of Lords on this subject, which took place on Friday the 3rd inst.

Earl GRANVILLE asked whether Mr. Whitworth had made an offer to her Majesty's Government to endow scholarships for the promotion of education in mechanical science. It appeared from a minute of the Privy Council, which had been published since he gave notice of the question, that Mr. Whitworth had offered to found thirty scholarships of £100 a-year each for the encouragement of students of mechanical science. That was, in his opinion, one of the most munificent acts ever performed, and looking to the results which might be expected to flow from it, he could not help thinking it one of the most magnificent and useful gifts ever

offered to the nation. It was evident that, in the opinion of this eminent engineer, science and practical education are not sufficiently connected in England, and that it was desirable workmen should receive a higher education than they did at present. That appeared to indicate the course which the Government should adopt, and he trusted that the Government would not shrink from a moderate expenditure to forward the object which Mr. Whitworth had in view. The course which the Government had adopted for the encouragement of the study of art might here be applied to the encouragement of science. He should be glad to know whether the Government had determined how they could best assist Mr. Whitworth in carrying out his great project?

The Duke of MARLBOROUGH passed a high eulogium on Mr. Whitworth, whose high-minded and liberal conduct indicated the right course for the manufacturing interest to pursue in promoting the spread of technical education, and extending the means of affording practical education in matters of science. It was more desirable that this encouragement should proceed from those who were directly connected with the manufacturing interest than that it should be carried out through State intervention. But it was not to be lost sight of that technical education so far differed from general primary education that it had a special and important bearing on the manufacturing prosperity of the country; and whatever assistance was required to be given for the promotion of this object, it would not be sound policy for the Government to initiate extensive measures on the subject. Those who ought to originate such measures were persons interested in the manufactures of the country. Mr. Whitworth's gift was a step in the right direction, and showed not only the value he attached to correct instruction in science connected with the industry of the manufacturing districts, but also his sense of the fact that provision should be made, in the first instance, by those whose own prosperity was dependent upon the progress of those districts. With regard to the action of the Department of Education in respect of this munificent gift, and the minute which has been made public, that minute of council had stated precisely the position of the Government in the matter. They had no knowledge at present how Mr. Whitworth wished the gift to be administered, or the exact manner of its practical application. A communication had been made to Mr. Whitworth requesting him to furnish the department with information upon the subject, and in that communication they had expressed their willingness to aid him in carrying out his views so far as was practicable. They were awaiting his reply. In all probability Mr. Whitworth would wish to retain the management of this fund in his own hands during his lifetime; but he would, no doubt, be desirous that the Government should assist him with some mode of examination by which the comparative merits of the candidates for the scholarships should be tested. As soon as the Government were in possession of the precise terms of Mr. Whitworth's wishes, they would give them their best consideration, with the desire of aiding him as far as they possibly could. As to the question whether the Government should assist the general progress of technical education, the suggestions of the noble earl were well worthy of attention. At a very small expense, and without going the length advocated in some cases and by some of the deputations which have waited upon the Government on the subject, very considerable assistance and great encouragement might be given to the progress of technical education generally, by following the principle that local efforts should be made in the first instance, and that such efforts should be supplemented by the Government giving some small assistance to professors or to colleges which might be brought into existence for this special purpose. It would be premature to say more at the present time. The whole of the question was under the consideration of a select com-

mittee of the other house at the present moment, and they would no doubt have this as well as other portions of it brought under their notice. He would only add that as the minute of council had been referred to by the noble earl he should lay it upon the table.

Lord TAUNTON said this noble gift came at a most opportune time, when public attention was so generally directed to the application of science to manufacturing and industrial processes. One of the advantages of the late Exhibition in Paris was that English manufacturers and her most intelligent workmen had returned to this country deeply impressed with the feeling that they could not afford to throw away any advantages which they could command in the competition to which they were now subjected. Many important branches of manufacture were beginning to feel the pressure of that competition greater than they had ever before known, and it was singularly appropriate that this movement in the direction of technical education should have originated with so distinguished a mechanician as Mr. Whitworth. He had no doubt his example would be followed not only by individuals, but by commercial associations, and that with the aid of the Government great progress in that direction might be made in future years.

The Duke of SOMERSET said he had known Mr. Whitworth pretty intimately for the last twenty years, and had visited his establishment at Manchester. It was most interesting to see the pains and care and the scientific application by which Mr. Whitworth had risen to his present eminent position. That gentleman in his own career showed how necessary it was to combine science with practical knowledge. We had plenty of good workmen, and scientific, but the difficulty was to find a good foreman; who, with the skill of the workman, united a superior scientific education, and was thus able to direct intelligently and effectively the labour of those under him. No doubt in many of the branches of technical education it was difficult for the Government to take any part, but they had already taken a very important step in that direction in the instruction in shipbuilding given at South Kensington, and he had no doubt that the system might be extended to other branches of industry.

#### PRODUCTION OF SULPHUR IN ITALY.

The total average annual production of sulphur in Sicily is estimated at 1,600,000 quintals (157,143 tons) and is divided amongst the various provinces in the following manner:—

Province	Quintals.
Caltanissetta .....	810,000
" Girgenti .....	610,000
" Palermo .....	60,000
" Catania .....	120,000
" Trapani .....	1,000

There are 615 sulphur mines, of which 237 were abandoned in 1864. The sulphur is carried to the surface on the backs of men, and the water is raised by pumps worked by animals, with the exception of 14 mines, where steam is employed for this purpose. The total engine-power amounts to about 100 horses. The number of *calcaroni*, or furnaces, for separating the sulphur from the impurities as extracted from the mines, are 4,367 in number.

The proportion of sulphur extracted from a cubic meter of mineral varies as follows:—

	Kilos.
Caltanissetta .....	180
Catania .....	165
Girgenti .....	132
Palermo .....	120
Trapani .....	100

Thus the average is 155 kilos per cubic meter of mineral throughout the island.

As the average price per quintal is 11 frs., the whole production may be estimated at 17,600,000 frs. (£704,000) per annum.

The total number of workmen in the sulphur mines of Sicily amounts to 21,510, and their average wages from 4·80 frs. to 1·55 frs. It is estimated that a miner produces 440 quintals (864 cwt.) of sulphur per annum; that is, extracts 284 cubic meters of mineral. Seven millions of francs (£280,000) is yearly expended for labour.

The production of sulphur in Sicily, which in 1830 was but 30,000 quintals, has now increased six-fold, on account of the great demand for it for industrial purposes. The following table shows the exports from the island from 1851 to 1866:—

Year.	Exports. tons.	Duty paid. francs.
1851 .....	94,985	—
1852 .....	98,037	949,000
1853 .....	110,997	1,072,000
1854 .....	141,343	1,376,000
1855 .....	112,384	1,087,000
1856 .....	148,052	1,435,000
1857 .....	139,747	1,339,000
1858 .....	134,442	1,288,000
1859 .....	175,968	1,684,000
1860 .....	143,783	1,370,000
1861 .....	156,645	1,566,000
1862 .....	155,330	1,553,000
1863 .....	169,956	1,699,000
1864 .....	155,678	1,557,000
1865 .....	159,657	1,596,000
1866 .....	184,173	1,842,000

The sulphur is transported by carts, or on the backs of mules to the following ports:—Catania, Licata, Girgenti, Palermo, Terranuova, and Trapani.

The following are the exports to the various countries:—

Countries.	1861.	1862.	1863.	1864.	1865.	1866.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
England ...	49,334	51,168	36,931	52,689	47,361	66,166
France .....	60,134	37,705	48,515	42,563	36,237	38,437
Other Countries } In the Island	43,539 3,538	58,102 5,363	76,321 8,191	55,909 5,117	71,021 5,038	72,825 6,745
Total ...	156,645	155,330	169,956	155,678	159,657	184,173

The following shows the quantity and value of the exports and imports of both raw and refined sulphur from 1862 to 1865:—

#### UNREFINED SULPHUR.

IMPORTS.			EXPORTS.	
Year.	Quantity. quintals.	Amount. frs.	Quantity. quintals.	Amount. frs.
1862 ..	11,442 ..	240,000	1,433,236 ..	30,098,000
1863 ..	6,714 ..	141,000	1,470,350 ..	30,877,000
1864 ..	7,515 ..	157,000	1,398,413 ..	29,366,000
1865 ..	1,088 ..	22,000	1,382,324 ..	29,028,000
Average, 6,689 ..	14,000		1,421,080 ..	29,842,000

#### REFINED SULPHUR.

IMPORTS.			EXPORTS.	
Year.	Quantity. quintals.	Amount. frs.	Quantity. quintals.	Amount. frs.
1862 ..	1,382 ..	46,000	22,257 ..	728,000
1863 ..	1,044 ..	34,000	57,275 ..	1,890,000
1864 ..	1,780 ..	58,000	35,524 ..	1,172,000
1865 ..	1,745 ..	57,000	70,841 ..	2,337,000
Average, 1,488 ..	49,000		46,474	1,532,000

Of the 35 sulphur mines in the district of Ancona, 23 are situated in the province of Forlì, and 12 in those of Pesaro and Urbino. Of these only 17 are worked at the present time, and the remaining 18 are suspended or abandoned.

In 11 of the mines worked at the present time the mineral is raised by shafts by means of horses or steam-power; in four the sulphur is extracted by means of a gallery with tramway. The quantity of mineral raised in 1865 was 675,872 quintals (66,380 tons). The most productive mine is that of Perticara di Talamella, which yields annually 208,000 quintals (20,429 tons) of mineral. The mines next in importance are those of Formignano, at Cesena, and of Marazzana, at Sant' Agata di Feltria, which each furnish about 90,000 quintals (8,840 tons) annually.

The number of furnaces for separating the sulphur from the mineral is 60, and the quantity of sulphur produced is 86,817 quintals (8,527 tons), of the value of 1,071,874 frs. (£42,871). The total number of workmen employed in these mines amounts to 1,425.

The wages of the miners vary from 4 frs. to 1·30 fr. per day, and of those employed at the furnaces, &c., vary from 2·50 fr. to 0·50 fr. During the year 1865, 57,900 frs. (£2,316) was expended in labour.

The refining of the sulphur is carried on in some cases near the mines, as at Perticara, Formignano, Zolfinelli (Romagna), or at separate establishments to which the sulphur is brought, as at Rimini, Cesena (Romagna), Catania, and Porto Empedocla (Sicily).

The total quantity of sulphur distilled in 1864 was 89,800 quintals, from which were obtained 82,250 quintals of refined and sublimed sulphur, in the proportion of 92 per cent. on the unrefined sulphur.

At each of the eight establishments for refining sulphur there are employed on an average six workmen. These establishments also produce annually 700 quintals of sulphuric acid, at 23 frs. per quintal, and 500 quintals of sulphate of iron, which sells for 25 frs. per quintal.

The value of the sulphur refined in Sicily amounts to 46,000 frs. (£1,840), and of that in the Romagna to 1,300,000 (£64,000). A great amount is exported to the Levant, Trieste, Lombardy, Tuscany, and Rome. Considering the great consumption at the present time for the vineyards, the price has fallen since 1862 (when it sold for 20·70 frs. the quintal) to 13·50 frs. the quintal.

### Fine Arts.

JURY FOR THE PARIS SALON.—The ballot for the election of jurors has produced the following list, the names in which are placed in the order of election:—Painting—Daubigny, Baudry, Bida, Pils, J. Breton, Gleyre, Cabanel, Cabat, Robert Fleury, Fromentin, François, and Gérôme; supplementary—Brion, Comte, Isabey, Meissonier, Ph. Rousseau, Millet, and Courbet. Sculpture—Barrye, Soitoux, Perrault, Guillaume, Dumont, Cabet, Marcellin, and Carpeaux; supplementary—P. Dubois, Joffroy, A. Millet, and Otteri. Architecture—Dubois, Vaudoyer, and Labrousse; supplementary—Baltard. Engraving and Die-Singing—Moulleron, Gaucherel, Henriquel-Dupont, Jacquemart, Flameng, Boetzel, and C. Nanteuil; supplementary—Lalanne and Pisan. The list includes all, or nearly all, of the professors of the Ecole des Beaux Arts, several members of the Institute, and not one unknown name, so that, although a few eminent names may be missed, the popular mode of election must be regarded as having worked admirably. It must be mentioned, too, that some artists whose names stand low in the list, or are absent from it, reside at a distance from Paris, or for other reasons have declined or would not be expected to act; amongst these may be mentioned Hamon and Hébert, both in Italy.

**FINE ART EXHIBITION AT HAVRE.**—An exhibition of works of art is appointed to take place this year in connection with the international maritime and commercial exhibition, and to open on the same day, namely, the 1st of June. The Count de Nieuwerkerke, Superintendent of Fine Arts, has accepted the honorary presidency of the artistic exhibition. It was originally proposed that this exhibition should be opened later in the season, in order to receive works from Paris, after the closing of the annual exhibition there in the middle of June, but it has been determined instead to reserve space for works from the Paris *Salon*.

**ANNUAL EXHIBITION OF FINE ARTS AT TURIN.**—The Society of Fine Arts (*Belli Arti*) of Turin, will open their annual exhibition of the works of living artists on Saturday, the 18th of April.

**SALE OF WORKS OF ART AT ROME.**—According to the *Giornale di Roma* the value of the pictures and sculptures, both ancient and modern, exported from the Pontifical States during 1867, amounted to not less than 21,623,310 francs (£864,932 8s.).

**PICTURE FROM ENGLISH HISTORY, BY BARON WAPPERS.**—Baron Wappers, president of the Brussels Academy of the Fine Arts, has recently painted a large work, of which the subject is taken from English history, the "Disembarkation of the first English Families in America, about 1620." It is unfortunate that this work having been painted for M. Aldama, a rich amateur in the Havannah, where it has already been sent, is lost to Europe, at any rate for a time, for the composition and colouring are spoken of very highly by French critics who have seen the picture. The composition includes twenty-two figures, and the style is semi-allegorical, conceived and executed in a masterly manner. Two young girls are singing a canticle of thanks for their prosperous voyage; another plants in the new world the seeds she has brought from the old; the head of the family fills the centre of the canvas, and his young wife with a baby in her arms leans confidently on his shoulder; a boy scans the novel scene with an eye of mere curiosity; and a labourer stands near with implements of husbandry. In the distance two girls offer up prayers for the future, while two male figures, representing civil and religious liberty, give free expression to their enthusiasm; other figures and the ship in the extreme distance fill up the picture. The colouring of the work is described as magnificent. The subject has a great interest for England, and it is to be hoped that we may be made acquainted with the composition and chiaroscuro of the work by means of photography or engraving, although we must remain strangers to its beautiful harmony of colour, which is said to be very remarkable. It is to be hoped that Baron Wappers will soon present us with some other examples of this high school of art, at present so rare.

## Manufactures.

**EXHIBITION AT TURIN.**—It is now definitely settled that an exhibition of national industry will be held at Turin during the forthcoming festivities on the occasion of the marriage of the Prince Humbert with the Princess Margherita. This exhibition will be held in the building formerly occupied by the Minister of Finance, in the Piazza Castello. The committee of the *Lega Pacifica* (a league for the encouragement of national industry) are doing their best to insure the perfect success of this show of national industry. Forty of the principal manufacturers at Turin have promised their support to the undertaking. The applications for space from intending exhibitors will remain open until all is filled. The expenses of carriage, &c., are to be borne by the exhibitors.

**OXYGEN FOR INDUSTRIAL PURPOSES.**—The Paris Society for the Encouragement of Industry offered, some time since, a prize for the economical production of oxygen on a large scale, and several attempts have been made, in consequence, to supply this gas for various

industrial purposes. The process adopted by M. Tessié du Motay and Maréchal, of Metz, and which was illustrated in the laboratory, by the water side, at the Paris Exhibition, consists in the employment of six cylindrical retorts, enclosed in a furnace, three of these retorts being filled with manganate of soda, and the other three with permanganate of the same alkali; a fan drives a current of hot air, deprived of its carbonic acid by being made to pass through lime-water, into the first three retorts, in order to convert the manganate which they contain into permanganate; superheated steam is forced into the other three retorts, which carries off the oxygen and converts the permanganate into manganate. The operation is afterwards reversed, the hot air being driven into the second and the steam into the first set of three retorts. The condensed steam passes from the retorts into a receiver, and the oxygen collected in a gasometer. An arrangement of the following kind has been applied to a number of gas-lights in front of the Hôtel de Ville, and has attracted much attention and some controversy. The oxygen is introduced into the lamp at a short distance from the common gas burner, and a small cylinder of magnesia being introduced into the flame, the effect is remarkably brilliant. —Another process has been employed by M. Gondolo, formerly pupil of M. Payen. This is based, in the first place, on a discovery of M. Boussingault, in 1855, and consists:—1. In changing oxide of barium into binoxide, by passing a current of air over the former when heated to a dull red. 2. In heating the binoxide to a bright red, and thus causing it to give up the oxygen derived from the air. By these two processes a large quantity of oxygen may be produced. The difficulties in the way of its industrial application were, the regulation of the fire, the semi-vitrification of the barytes, and the breaking of the porcelain tubes employed. M. Gondolo has modified the process by using cast-iron tubes enamelled with a special mixture, by mixing the barytes with an alkali or with earthy matter, and by the improvement and simplification of the apparatus; and he is now able, we are told, with the aid of a common labourer and very little fire, to produce many cubic metres of oxygen in a quarter of an hour. One of these apparatus has been in use for several months, and one hundred and twenty operations, carried out without an interval, left the barytes unaltered. The process is said to be very economical, which is the grand point in view. The azote produced by the decomposition of the air is received in a special vessel for use, while the oxygen is collected in a gasometer for illuminative or other purposes. M. Gondolo is now engaged on experiments with the latter gas, in connection with the fusion of metals, the modification of the Bessemer processes, and the rapid transformation of certain chemical substances for dyeing and other purposes.

**CO-OPERATIVE BAKERY IN PARIS.**—Two thousand five hundred Paris ouvriers have formed a society for the establishment of a co-operative bakery, with a capital of £2,000, to be raised, as required, to four times that sum. Those who desire to join the society have only to pay one franc on application, and a quarter of that sum afterwards, until the subscription amounts to twenty francs. The society has purchased one of the mechanical bread-makers on the Lebeaudy system, exhibited at the late Paris Exhibition. The bread is to be delivered at the houses of the members, but only in proportion to the number of persons forming the family, the members of the society forfeiting all their rights if they sell any. Should this first society succeed there is little doubt that others will be formed immediately.

## Commerce.

**RAILWAYS IN SARDINIA.**—According to the new contract between the Italian government and Sardinian Railway Company, the following lines are to be opened

to the public not later than the end of December, 1869:—Cagliari to Iglesias, Cagliari to Oristano, and Sassari to Porto Torres. The other lines, namely, from Oristano to Terranova, and from Sassari to Ozieri, have not been overlooked, but no period has yet been fixed for their completion.

**LINE OF STEAMERS BETWEEN ANTWERP AND BAYONNE.**—The *Union Bayonnaise*, the first of a new line of steamers, a vessel of 500 tons burthen, has just arrived, in less than four days, at Antwerp from Bayonne, thus inaugurating a rather important new commercial line.

**TREATY OF COMMERCE WITH FRANCE.**—It is said in Paris, that a member of the Corps Legislatif, M. Pouyer Quartier, intends to put a question to the government concerning the protests that have been received respecting the treaty of commerce between France and England. It is added that as the signatures of seventy deputies have been attached to M. Pouyer Quartier's application, it is probable that the interpellation will be allowed, in which case the discussion, which is likely to be very animated, will take place soon after Easter.

**COFFEE CULTIVATION IN SOUTHERN INDIA.**—The *Neilgherry Excelsior*, quoted in the *Produce Markets Review*, says:—"There is a rather large coffee plantation at Coonoor, the property of a Mahomedan gentleman. It is overgrown with weeds and ferns; but the owner nevertheless calculates on a crop of 1,500 maunds, equal to fifteen tons. Supposing that he sells the produce at 600 rs. a ton, he will realise some 9,000 rs. Should he prefer shipping to England, the out-turn will of course be greater. The berry is said to be of a peculiarly good quality; but what we wish particularly to draw attention to is the cheap way in which the native goes to work compared with the European. The estate in question, we have said, is overgrown with weeds and ferns. 'Never mind,' says the owner, the crop will pay me.' And so it will. He has four men on pay, whose duty it is to see that the weeds and ferns do not encroach too much on the coffee plants. For the rest he trusts to nature and the good will of 'Allah.' At the picking season he employed sixteen additional labourers. He begins early, and the berries are taken off the trees as they ripen. 'There is no use employing too many hands,' he says; 'by the time the berries are taken off this batch, and the men are done with that yonder, all the green berries here will be ripe for their return.' And so he goes on composedly, without making any hurry or fuss about it. The four permanent labourers cost him 336 rs. a year; for three years, 1,008 rs. The sixteen additional for the picking, at 6 annas a day, say for three months, 540 rs. making a grand total of 1,548 rs., against 9,000 rs. ? A European on the other hand would say: 'I must employ coolies to dig up the weeds, and away go 50 rs. a day. Then, 'the plants want manure and water.' Another 30 rs. or 40 rs. a day is spent in supplying manure and bringing down water. And thus the profit is often frittered away. It appears, however, that there are 326 coffee estates in Southern India, Mysore excluded, and, consequently, coffee cultivation must be a good speculation, or so many estates would not have been opened and managed; of these, the Neilgherries have 73 estates, the Wynaad 190, and Teppacadoo 2. The Wynaad, notwithstanding its notoriety for fever, has two and a half estates to every one on the Neilgherries, or more. When such risk of health is incurred, coffee cultivation must be a good speculation."

**EXEMPTION FROM RIVER DUES ON CEREALS, &c., IN FRANCE.**—An Imperial decree has just appeared, suspending all river and canal dues and navigation charges appertaining to the State on vessels laden with grain, flour, rice, potatoes, or dried vegetables, from the 28th of March to the end of September; the exemption applies to the vessels and boats of all countries, without exception. The exemption is extended to vessels which have quitted port with their cargoes previous to the 30th September, no matter on what date they may reach their destination.

**PRODUCTION OF PETROLEUM IN ITALY.**—In the neighbourhood of Chieti, in the Abruzzi, there are three deposits of petroleum. At one of these deposits, situated below the Colle d'Oro, at a short distance from Tocco Casauria, petroleum is obtained by sinking wells about 190 feet in the soil; it is also obtained from natural springs, but in small quantities. At another deposit in the same district, a bituminous shale, mixed with water and earth, is accumulated in reservoirs, and distilled at Porto Recanati. The third deposit is that of Lettomannoppello, where excavations have been made for the purpose of obtaining bituminous asphalte, from which petroleum has been distilled, but the results have not been sufficient to encourage the pushing on with the excavation. The first of these deposits furnished in 1865 1,800 quintals of petroleum, of the value of 36,000 frs., and 500 quintals of thick bituminous shale, amounting in value to 7,000 frs. At the first of the two wells 80 persons are employed (50 men and 30 women), and at the other only eight workmen. The wages of the men are 1 fr. 50 c. per day, and the total expenditure for labour was 14,160 frs. Various petroleum wells have existed since the beginning of the century in the provinces of Parma, Piacenza, and particularly in the neighbourhood of Fornovo, Medesano, and Groppello. The petroleum wells in the province of Emilia in 1862 were 28 in number, but only 19 are worked at the present time. They produce about 26½ kilos. daily, or 9,628 kilos per annum. This shows that the production of petroleum up to the present time is inconsiderable, but it must be remembered that the extraction of the petroleum is carried on in the most primitive manner, much without the aid of machinery of any kind. The Government, with the intention of developing this industry, last year granted three concessions for working the petroleum mines in the provinces of Pavia and Piacenza. Two of these concessions were granted to the American firm of Mayo and Botta, in the districts of Fornovo, Taro, and Medesano; and the third concession is the property of a Genoese company, "L'Esploratrice," in the valley of Riglio, in the commune of Groppello. The former firm are employing American machinery, and the Genoese company are carrying on their works on a large scale, and have already sunk four artesian wells by mechanical appliances. The refining of the bitumen of Tocco, Casauria, and of Lettomannoppello is carried on at Porto Recanati (Macerata). In 1865 the quantity of petroleum obtained from 500 quintals of bitumen was as follows:—

	Quintals.	Francs.
Light petroleum .....	250 .....	18,750
Heavy .....	120 .....	7,200
Asphalte .....	100 .....	1,500
Total .....	470 .....	27,450

The yearly wages of the two refiners and three labourers employed in this establishment, amount to about 2,000 francs. Another refinery is being established on a large scale at Grottammare (near Ascoli). The following are the exports and imports of petroleum in Italy from 1863 to 1865:—

	Imports.		Exports.	
	Quantity.	Value.	Quantity.	Value.
	Quintals.	Francs.	Quintals.	Francs.
1863 .....	123,258	3,327,000	2,280	61,000
1864 .....	32,449	876,000	3,763	101,000
1865 .....	36,030	972,000	1,473	38,000
Average	63,912	1,725,000	2,505	67,000

### Colonies.

**STATE OF VICTORIA.**—A private circular from Melbourne says:—"Trade has improved, but only to a very



small extent, and this has caused the more surprise, as the great industries of the colony are at present more than usually prosperous. For some time serious fears were entertained of a very deficient harvest, and in several districts there has been a failure of crops, but this is compensated by unusually good returns in other districts, so that, on the whole, it is believed the harvest will come up to the average. In consequence of the excellent season for pasture, there will be a very large clip of wool, and the surplus of fat stock is so great that the price of butchers' meat is comparatively nominal; measures are consequently in progress, by means of companies and individual enterprise, to boil down both sheep and cattle for tallow, and to preserve the meat for export to England. The third great interest of the colony—the gold mining—has experienced a revival, in consequence of fresh discoveries at Ballarat and elsewhere; and from the greater command of water afforded by the new reservoirs made and in course of construction, it is probable that the production of gold may in a short time be permanently increased. During 1867 only four pastoral stations were sold, and at this moment runs are more than ever unsaleable. As regards Melbourne, however, the chief cause of the present dulness is its loss of the intercolonial trade. A variety of causes are assigned for this, some asserting that it arises from the cessation of the imports of breadstuffs, others that the change is owing to the direct trade which has naturally sprung up between the neighbouring colonies and Europe, whilst the free-traders allege that it is caused by protective duties. Whatever may be the cause, the fact is certain that a great check has been given to the intercolonial trade. Immigration is comparatively at a standstill, and there seems no present prospect of its renewal. On the whole, it may be safely affirmed that while the condition of the colony is sound, there is a very considerable pressure for money, and necessarily a spirit of economy. During the present year this is likely to continue, and consignors should be very cautious, and on no account increase their shipments, unless there is a revival of emigration to the colony."

**PEARLS IN WEST AUSTRALIA.**—A Perth paper says:—"Great success has attended the pearl fishery on the north-west coast, and this has induced the fitting out of several small vessels for enlarging it. At present it can scarcely be called a fishery, as at best all that is done is to prowl along the coast and gather as many as can be seen at low water; even by these rude means between 40 and 50 tons have been taken this season, most of which is on its way to England. It is evident a vessel fitted with proper diving apparatus would make a good thing of this fishery, as it is said very large shells are to be seen lying in deep water; a vessel so fitted was expected at Nicol Bay a short time since. The shells are known to exist all along the coast."

### Notes.

**HOW LIGHT SOVEREIGNS ARE DISPOSED OF.**—Those who have now and then to pay in sovereigns at the Bank of England know how often one or two or more light sovereigns are rejected—that is to say, not returned, but clipped, fourpence being charged for the unpleasant process. The popular impression is that these cut sovereigns go back to the Mint to be remelted and recoined. But there are a vast number of trades in England which require standard gold for all sorts of purposes, and these regularly go to the Bank to buy these cut sovereigns. The reason is obvious; few trades use so much gold at once as to require an ingot of gold, which weighs from 250 to 300 ounces, and if they did, they have seldom the means necessary to melt it. But they can buy the cut sovereigns by the ounce or the pound; and though as coins they may have been light, yet as metal they are known to be pure. In this manner, between the gilding and porcelain trades, an immense amount of gold is

annually absorbed. The porcelain trade alone takes nearly £50,000 worth of gold a-year, and between gilding and porcelain the annual consumption of England and France is estimated at not less than 40,000 ounces, which is lost to currency for ever.

**ELECTRIC TELEGRAPH.**—Mr. Latimer Clark gives the following particulars of some of the recent performances of the Atlantic Telegraph. At the anniversary banquet given to Mr. Cyrus Field, messages were sent from London and answers received in the following periods:—From the President at Washington, two hours ten minutes; from Mr. Seward at Washington, two hours 25 minutes; from several persons in and near New York, average one hour 45 minutes; from the Governor of Cuba, who apologised for the delay caused by his residing at a distance from Havannah, two hours twenty-four minutes; from the Governor of Newfoundland, at St. John's, 38 minutes; and from Heart's Content, Newfoundland, six minutes. But even these performances are thrown into the shade by an ordinary message sent from London to San Francisco on the 1st February. The wires in America were joined up for experiment from Heart's Content to California, and the message was sent from Valentia at 21 minutes past 7 in the morning; the acknowledgment of its receipt was received back in Valentia at 23 minutes past 7, the whole operation having only occupied two minutes; the distance travelled was about 14,000 miles, and the message arrived, according to San Francisco time, at 20 minutes past 11 on the evening of January 31, or the day preceding that on which it left England.

**ARCHÆOLOGICAL DISCOVERIES IN ITALY.**—A highly interesting discovery has been made at Rome in the finding of eight new fragments of the plan of ancient Rome, engraved on marble, by the order of Caracalla. Two of the fragments are of considerable size, and one of them clearly represents the *porticus Livie*. There seems no question that these fragments formed part of the plan encrusted in the walls of the staircase of the capitolian museum, and, taken in connection with the recent important discoveries made on and around Mount Palatine, they possess great interest. In the district of Volterra, in Tuscany, near the sea, and at the foot of the hill on which stands Castagneto, the feudal seat of the family of Gherardesca, the remains of an ancient house have been discovered; the impluvium and the pavements of four chambers, executed in mosaic in the Pompeian style, have been laid bare. The mosaic is said to be very well preserved, and to be remarkable both for design and colour. The excavations are being continued.

**PARIS NUMISMATIC AND ARCHÆOLOGICAL SOCIETY.**—This society has inaugurated its fourth year of existence by the opening of more spacious rooms for its conferences, collections, and library, at No. 58, Rue de l'Université. In addition to some interesting publications, this comparatively new society has established weekly conferences; and it is divided into sections for the study of inscriptions, historic geography, and the history of ceramic art. It was commenced by the Vicomte de Ponton d'Amécourt and eleven other gentlemen, and now numbers 120 members and 220 correspondents.

**INSECT MENAGERIE.**—It is proposed to establish an exhibition of living insects in the new public garden which is being formed at Montsouris, in the outskirts of Paris, and M. Hamet, professor of agriculture at the Luxembourg, is directed to draw up a report on the subject for the municipal council. Without taking into account the parasitic creatures that could not conveniently be exhibited alive, there are more than 20,000 species and varieties in the insect world.

### MEETINGS FOR THE ENSUING WEEK.

Mon.....Medical, 8.  
Tues ...Medical and Chirurgical, 8½.  
          Photographic, 8.  
          Anthropological, 8.

- WED** ...Society of Arts, 8. Mr. B. H. Paul, "On Liquid Fuel." R. Society of Literature, 8½.
- THUR** ...Linnæan, 8. 1. Rev. Geo. Henslow, "On the Variations of the Phylotaxis in the Jerusalem Artichoke, *Helianthus tuberosus*." 2. Rev. Geo. Henslow, "Note on *Genista tinctoria*, as apparently affording facilities for intercrossing distinct Flowers."
- Society of Fine Arts, 8. Mr. Hyde Clarke, "On Ephesus." Zoological, 8½. Chemical, 8. Numismatic, 7.

## PARLIAMENTARY REPORTS.

### SESSIONAL PRINTED PAPERS.

Par. *Delivered on 26th March, 1868.*  
Numb.

44. Bill—Weights and Measures (Metric System).  
70. " Petit Juries (Ireland).  
74. " Perth and Brechin Provisional Orders Confirmation.  
75. " Petty Sessions and Lock-up Houses.  
76. " Revenue Officers Disabilities Removal.  
86. " Army—Statement of the Savings and Deficiencies.  
148. East India (Currency)—Report.  
Public Petitions—Tenth Report.

SESSION 1867.

408. Pilotage—Abstract of Returns.

*Delivered on 27th March, 1868.*

50. Bill—Divorce and Matrimonial Causes Court.  
166. Navy—Additional Papers.

*Delivered on 28th March, 1868.*

77. Bill—Local Government Supplemental (1868).  
169. Union with Ireland—Fifth Article of the Act.  
Colonial Possessions—Reports (Part I. West Indies).  
Public Petitions—Eleventh Report.

SESSION 1867.

431. (c.) Poor Rates and Pauperism—Return (C).

*Delivered on 30th March, 1868.*

164. Bullion—Return.  
166. Navy—Additional Papers (corrected copy).  
Crete—Reports of Consul General Longworth.

SESSION 1867.

431. (A IX.) Poor Rates and Pauperism—Return (A).

*Delivered on 31st March, 1868.*

119. (t.) Trade and Navigation Accounts (29th February, 1868).  
182. Civil Services—Estimate "on account."

*Delivered on 1st April, 1868.*

22. Madras Sanitary Commission—Report.  
52. Parliamentary Papers—Return.  
147. East India (Ladakh)—Correspondence.  
154. Fines and Penalties (Ireland)—Abstract of Accounts.  
162. Duchy of Lancaster—Account.  
Public Petitions—Twelfth Report.

*Delivered on 2nd April, 1868.*

64. Bill—Elementary Education.  
79. " Marriages (Frampton Mansel).  
80. " Prisons (Compensation to Officers).  
98. Civil Services; Revenue Departments; and Post Office Packet Service—Estimates.  
155. Matthew Lynagh—Report of Commissioners.  
159. Court of Session, &c. (Scotland)—Return.  
161. Roman Catholic Laity (Ireland)—Declaration.

*Delivered on 3rd April, 1868.*

81. Bill—United Parishes (Scotland).  
82. " Electric Telegraphs.  
158. Slave Trade—Return.  
160. Salmon Fisheries (England and Wales)—Seventh Annual Report.  
173. Millwall Iron Works Company—Correspondence.  
178. East India (Employment of Natives)—Return.  
180. Foreign Cattle—Petitions, &c.  
182. Civil Services—Estimate "on account" (corrected copy).  
188. Extra Receipts—Treasury Minute.  
191. Coronation, &c., Oaths—Return.

## Patents.

*From Commissioners of Patents' Journal, April 3.*

### GRANTS OF PROVISIONAL PROTECTION.

- Animals, cleaning—772—D. Price and C. Rowe.  
Bale ties—972—W. R. Lake.  
Barometers, &c.—984—A. Barclay.

- Boilers—918—W. R. Lake.  
Boots for hunting, &c.—953—J. H. Cooper.  
Bottles, &c., ornamenting—789—S. Brown.  
Brakes—859—A. Taylor.  
Bricks and tiles—937—W. Richardson.  
Bricks, lime, &c.—943—H. Chamberlain, J. Craven, & H. Wedekind.  
Cartridges—952—J. Abraham and T. R. Bayliss.  
Cinders, separating and crushing—929—B. Parks.  
Corkscrews—956—G. Twigg and H. Bateman.  
Cotton, &c., carding, &c., the fibres of—807—H. B. Barlow.  
Cotton, &c., combing—935—G. Davies.  
Cruet and egg frames—736—F. Cadby.  
Dampers, &c., apparatus for closing—934—E. Rowland and J. Dalton.  
Engines, locomotive—913—J. M. Ure.  
Engines, locomotive—982—C. de Bergue.  
Engines, locomotive, facilitating the ascent of gradients by—903—P. M. Villamil.  
Engines, steam—919—R. Meldrum.  
Fabrics, treating—919—G. Martin.  
Feet, coverings for the—908—J. M. Poinsel.  
Fire-arms, breech-loading—800—W. W. Greener.  
Fire-arms, breech-loading, and cartridges—980—A. W. Ramsar and F. W. Wilson.  
Fire ranges, close—955—J. H. C. Bade.  
Floors, covering for—920—A. V. Newton.  
Furnaces—917—E. Butterworth.  
Gas burners—976—J. Brünner.  
Grain kilns, heating air for—950—A. Brownlie.  
Hair stuffing, substitute for—905—W. R. Lake.  
Hats, manufacturing—826—J. Vero.  
Human frame, applying remedial agents to the—942—L. Encausse.  
India-rubber, &c., treating—939—W. Hooper.  
Indicators for showing the number of passengers carried in public conveyances, &c.—902—Sir J. Macneill.  
Iron, spent oxide of, treating and obtaining products from—923—B. E. R. Newlands.  
Lace, machinery for manufacturing—974—C. E. Brooman.  
Lamp shades, &c., holders for—986—H. Treverton and E. H. Fowler.  
Lamps—993—J. Murray and R. Warden.  
Lamps, moderator—957—J. H. Maw.  
Lawn mowers—962—W. S. Boulton.  
Levers, compound—945—R. Side.  
Life-boats—954—C. Gunner.  
Lubricators—900—C. Womersley.  
Medicine, measuring and administering—911—W. E. Newton.  
Millstones, &c., apparatus for manufacturing—953—G. Davies.  
Millstones, &c., cutting and dressing—921—R. A. Wright.  
Mines, supports for the roofs of—932—J. Edwards.  
Mines, &c., extracting foul air from—893—R. Smith.  
Optical illusions, producing—925—J. B. Lianett.  
Perambulators, &c., breaks for—928—P. Hill.  
Pistons, &c., packing for—957—S. Duer.  
Portfolios—716—H. P. Reynoldson.  
Propulsion, auxiliary—844—J. Bourne.  
Safes—926—G. Wallis.  
Sandals or overshoes—964—W. G. C. Hudson.  
Silk, &c., doubling, &c.—940—J. L. Geiger.  
Spinning and twisting machinery—933—W. Redman.  
Steel, &c., producing—909—W. E. Newton.  
Straps, belts, &c.—906—J. M. Poinsel.  
Sugar, &c., from beetroot—973—G. F. Guy.  
Valves—912—J. F. Spencer.  
Watches—959—E. D. Johnson.  
Water-closets, &c.—966—J. G. Jennings.  
Weaving, figure, apparatus for—915—C. F. C. Cretin-Borne.  
Windmills—938—F. Warner and H. Chopping.  
Windows, &c., ventilating—931—W. R. Lake.  
Wood-shaping machinery—907—J. and J. Thompson.  
Wool, &c., opening and cleaning—947—C. Mather.

### INVENTION WITH COMPLETE SPECIFICATION FILED.

- Ordnance, mechanism for taking up the recoil of heavy—1083—C. S. Tyson.

*From Commissioners of Patents' Journal, April 7.*

### PATENTS SEALED.

- |                                |                      |
|--------------------------------|----------------------|
| 2630. T. C. Clarkson.          | 2841. J. Speight.    |
| 2805. W. Low and J. Treadwell. | 2852. A. M. Clark.   |
| 2808. W. R. Lake.              | 2933. S. S. Maurice. |
| 2813. J. Smith.                | 3071. J. Watkins.    |
| 2822. J. H. Brown.             | 3246. R. Heathfield. |
| 2826. J. B. Hulme.             | 3271. K. J. Winslow. |
| 2835. A. Danilecki.            | 3352. E. H. Bentall. |
| 2840. W. Potts.                | 3651. M. J. Rice.    |

### PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

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|-----------------------|------------------------|
| 1700. M. Ashby.       | 955. W. E. Newton.     |
| 924. G. Burt.         | 1007. G. Davies.       |
| 958. G. T. Bousfield. | 962. J. G. N. Alleyne. |
| 971. F. R. Ensor.     | 1058. C. F. Cotterill. |
| 986. F. Hugon.        | 973. R. Maynard.       |

### PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

- |                             |                        |
|-----------------------------|------------------------|
| 877. F. Ransome.            | 832. A. V. Newton.     |
| 819. W. and F. W. Crighton. | 825. J. G. N. Alleyne. |